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# The Shifting Role of Large Livestock in Northeast Thailand

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**Abstract**

In 1976 large livestock populations overall began to decline along with other developmental changes in Northeast Thailand. The developmental trend greatly influences the livestock population. In the past, livestock played important roles in farming systems at household and community levels. The aim of this study is to re-examine the changes in roles of livestock. Households were selected according to household activities, including labor for livestock raising. Village leaders, village administrative committees or key informants, and households were interviewed by using a semi-structured interviewing technique. In order to confirm that the data collected was accurate, representatives of leaders involved in livestock raising or marketing from every province were interviewed in groups. The numbers of livestock raised by the villagers varied from one village to another and there are fewer buffaloes than cattle. Animal power utilization has been related to land preparation for paddy and for upland crops, weeding, and paddy threshing. However, these roles have greatly declined and been replaced by farm mechanization, such as hand tractors, herbicides, and mobile threshing machines. The contribution of livestock to the ecology through livestock manure in terms of soil fertility has declined. Strategic uses of livestock as a saving bank or as a commodity to be sold for immediately needed cash has declined. Therefore dependency of the farmers upon money, instead of natural resources, has become more pronounced to their livelihood. Uses of livestock in bartering systems, such as an exchange for land rights or other necessary goods, has been mostly replaced by a buy-and-sale system, especially in popular weekly livestock markets. Other roles of livestock, related to passing on of inheritance, rituals etc., have declined and been replaced mainly by consumer goods. Replacement of livestock by external inputs has produced an impact on community systems fostering dependency, a loss of indigenous knowledge, and, probably, *increased consumptive* behavior.

**Keywords:** Northeast Thailand, large livestock, roles, dependency, livelihood, household, community

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## Introduction

Northeast Thailand encompasses 170,218 square kilometers and has long been known as a major livestock production region of the country. Most of the area is rolling in terms of topography [Lovelace *et al.* 1988: 14]. Pendleton [1943: 31–33] has described livestock production systems of the region. In the past, almost every household raised at least several heads of livestock (native cattle and buffaloes). Besides serving as an agricultural commodity for sale in the case of cattle and/or for draught in the case of buffaloes, dung produced by the livestock also served as manure for crop cultivation. Most of the farmers raised more cattle than buffaloes because they were easier to raise if there were no outbreaks of disease such as anthrax or rinderpest. Livestock traders accumulated buffaloes and cattle and herded them to the central plain to be sold.

Because of thieves, at night livestock were kept in corrals underneath the house which became a manure collecting site. Livestock manure was important for mulberry and tobacco growing. Excess manure was used for rice nurseries. In the ethnic Phutai communities where there were no thieves, at night livestock were kept in corrals close to forests around villages during the dry season. They were moved to higher areas in the rainy season. Manure left in the corrals was used for tobacco growing. Fertile areas around the corrals were used for home gardening. By doing this they did not have to practice shifting cultivation. Rufener [1971: 152–153] indicated that more than 70% of all households in studied villages did not own any cattle while about 70% own and manage buffaloes. Land cultivation depended almost entirely on buffalo power. Rufener [*loc. cit.*] and Prapertchob and Kachamart [1983: 82–87] also reported similar cattle and buffalo production pattern and utilization.

After 1976 the livestock population throughout the northeast began and continued to decline. In the case of buffaloes, numbers dropped from 3.6 million heads in 1976 to only 2.3 million in 1997. However, the population of cattle dipped and then increased, going from 1.7 million heads in 1976 to 1.5 million in 1980 and then back up to 2.3 million by 1997 [Thailand, Division of Agricultural Economics 1977: 72; 1981: 73; 1998: 118]. Prapertchob and Kachamart [1983: 82–83] also reported the decline in livestock population proceeded along with other developmental changes in the region and the country.

Decline in livestock populations appeared to be related to various aspects of development over a long period. It is rather difficult to point out the causes and effects of the relationship. However, a sequence of changes can be described. Around 1961, the forest area in this region was about 53.3% [Wongkul 1994: 87]. After the government introduced timber concessions, the forest area declined sharply. The cleared forests were replaced by extensive cash crop production, such as kenaf and cassava that in turn stimulated more forest clearing. At the same time the human population greatly expanded and caused further acceleration of forest clearing for village settlements and more cash crop production.

A number of other factors contributed to the overall decline of the number of livestock. The price of livestock was not attractive enough for farmers to keep raising them on their farms. Moreover, the loan policy of the Bank of Agriculture and Agricultural Cooperative encouraged more replacement of livestock by small hand tractors for draught power as well as transportation purposes. While over the past two decades Thailand has been moving fast toward the status of a new industrialized country, farm labor shortages have occurred due to mass migration of labor to large cities, leaving little family labor to look after livestock which in turn necessitated more use of small hand tractors.

The above developmental trend greatly reduced livestock populations along with their roles and functions in farming households and communities. In the past livestock assumed multifunctional roles on the farms but have now largely been replaced by various external inputs. Such replacements have contributed to dependency and a variety of environmental problems such as debt, declining soil fertility and increased use of chemical fertilizer and pesticides. As a result, local farmers have become increasingly dependent on external inputs and assistance. Recently, Thailand suffered effects of the economic crisis of 1997. To cope with the crisis, a concept of “sufficiency economy” was introduced to the rural sector of the country by the present king of Thailand. The concept was based on integration, self-reliance, and sustainable development at household and higher levels of community. Under this approach integration of livestock into the existing farming systems is recommended. At the same time the price of livestock has recently become more attractive to farmers and livestock raising is expected to become an important part of their farming systems again. Due to the vast amount of changes of socio-economic conditions and patterns of cropping in the farming communities, along with a great decline of livestock, the question of how livestock exist in present farming systems and what its roles must be examined.

## Methodology

The methodology used in this study is mainly qualitative because most of the data needed had to be recalled by the local farmers and because, more importantly, the focus is on the interrelationship of the parameters involved the roles of livestock (limited to cattle and buffalo only). However, some quantitative data are used to support findings. Triangulation, through site selection, types of farmers and their activities, level of social structures such as households, groups, and communities, is used in data collection and verification.

*Site Selection*

Criteria for site selection were:

1) Land use. Village land uses are highly related to cropping patterns which are then related to livestock raising. Villages with both paddy and upland crops were selected —either villages with upland crops with little paddy or villages with mostly paddy.

2) Household activities. This criteria is related to available labor in households including labor for livestock raising.
3) Rain-fed and partly irrigated villages were selected to reflect different cropping patterns. Two villages were selected to represent rain-fed agriculture, the most common situation of the region. The other two villages represented some irrigated areas.

Besides these specific selected villages, whilst in the field, important data from other villages was also collected and integrated into the analysis.

*Data Collection*

Secondary data was collected from relevant reports and research documents.

Primary data was collected stepwise in October 2000, as follows:

1) Group interview: 10 to 15 key informants including village leaders, village administrative committees, and especially those involved in livestock raising of each selected village were interviewed by employing a semi-structured interviewing technique in combination with direct observation to gain information on village histories, village livelihood systems, and livestock raising systems. Most of the interviewees were middle aged or older.
2) Households interview: In addition to group interviews, in each village different patterns of livelihood systems at the household level were identified based on land uses, economic status, and household activities with and without livestock raising status. Semi-structured interviews and direct observation were employed to gain information on household livelihood systems and on livestock raising. Twenty-six households were interviewed.
3) Validation of data collected: In order to verify the data collected and to obtain more data, 50 representatives that had been involved in livestock raising or marketing within the network of village cooperatives from every province in Northeast Thailand were group interviewed. Data needing validation were mainly used in discussion.

*Data Analysis*

After each step in the fieldwork the collected data was analyzed and reviewed. Incomplete or conflicting data was filled in or clarified during further interviews. Different types of villages were analyzed and compared issue by issue as relating to changes of roles of livestock and their impacts.

## Result

*Village Context*

*Economic Condition*

The four villages studied are: (1) Ban (village) Khon Kaen, Khon Kaen province, (2) Ban Kalasin, Kalasin province, (3) Ban Mukdahan, Mukdahan province and (4) Ban Srisaket,

Srisaket province. The names of the villages reported here are assigned names and not real names. Characteristics of the four villages differ in respect to size, location, land use, on-farm and off-farm, fishing activities, labor migration and population that are elaborated below (Table 1). Village Mukdahan appeared to be better off than the rest of the selected villages in terms of economic activities. The village is large in size and in the proximity of the provincial city. Most of the land is paddy but is also irrigated. Therefore after the paddy season (June–December) growing diversifies into dry season crops for commercial purposes. Moreover a prominent off-farm activity, border trade with neighboring Lao People Democratic Republic (PDR), is practiced along with other off-farm activities. Next down the line is Village Srisaket. Even though a major part of the land was rain-fed paddy, there is a high level of underground water that could be used for agricultural production. A small part of the paddy land is irrigated. The village is relatively large in size with many off-farm activities both inside as well as outside the village. Next is Village Khon Kaen. It is close to an irrigated area but is unable to use irrigated water due to its higher land level. Paddy and upland areas are almost equal in proportion. Only a few agricultural options exist. The least viable economically community is Village Kalasin. This village is close to a large water reservoir but was without irrigation. Major portions of the land are upland but few field crops are being grown.

*Village Settlement*

Houses in Villages Khon Kaen and Srisaket are clustered together with a higher density in the latter and both villages have agricultural land surrounding them. Houses in Village Mukdahan are laid out in a linear fashion along the bank of the Mekong River. Finally, Village Kalasin homes are laid out in a block fashion with each home within distance of its agricultural land as it was a relocated settlement. It should be noted that different patterns of settlement may affect livestock raising.

*Agricultural Land Use*

Land for agricultural use in Villages Khon Kaen and Kalasin are limited to only a few crops being cultivated such as paddy, cassava and sugar cane. Especially in Village Kalasin limited paddy land causes chronic rice-insufficiency. Due to available water resources, Villages Mukdahan and Srisaket have more of a variety of crops being cultivated such as paddy, green onions, shallots, chillies, and many other vegetables. Easy access to a market for dry season crops and close proximity to the provincial city and the Lao PDR border give Village Mukdahan an advantage.

*Off-farm Activity*

Villages Mukdahan and Srisaket appear to have comparatively more off-farm activities. These activities can be divided into those that are carried out within the villages such as garment, shoe, and rice noodle production, and those that laborers must conduct outside the villages.

*Migration*

Before the economic crisis out-migration of the villagers to earn a living had been a common phenomenon. After the crisis, reverse migration occurred in all the villages. However, out-migration then reappeared, in different proportions in each village. Due to more natural resources and off-farm economic activities, Villages Mukdahan and Srisaket have a lower proportion of such migration as compared to the other two villages.

**Table 1** Profile of the Studied Villages

| Profile | Village | | | |
|---|---|---|---|---|
| | Khon Kaen | Kalasin | Mukdahan | Srisaket |
| Settlement* | Cluster, villager established | Linear, government established | Linear, villager established, along river bank | Cluster, villager established |
| Number of households | 141 | 109 | 134 | 212 |
| Total population | 707 | 553 | 626 | 738 |
| –Male | 372 | 271 | 313 | 403 |
| –Female | 335 | 282 | 313 | 335 |
| –Labor force (15–59 years) | 475 | 399 | 443 | 479 |
| Roads to the district | | | | |
| –Asphalt (km) | 4 | 1 | 6 | 12 |
| –Dirt (km) | – | 3 | – | – |
| Distance to the district (minutes) | 5 | 30 | 15 | 30 |
| Cultivated land (*rai*) | 2,219 | 1,000 | 1,700 | 3,900 |
| Proportion of land* (paddy : upland) | 40 : 60 | 10 : 90 | 92 : 8 | 75 : 25 |
| Landless households (%) | 3 | 43 | 2 | None |
| Main crops* | Rice, maize, sugar cane, cassava | Rice, cassava, sugar cane | Rice, peanuts, spring onions | Rice, peanuts, shallots, kenaf |
| Households with members out-migrating** (%) | 7 | 28 | 25 | 93 |
| Households raising cattle (%) | 15.6 | 22.9 | 17.2 | 7.5 |
| Number of cattle | 440 | 25 | 68 | 50 |
| Households raising buffaloes (%) | 2.8 | 9.2 | 11.2 | 17.5 |
| Number of buffaloes | 12 | 10 | 38 | 102 |
| Households cultivating rice (%) | 99.3 | 18.3 | 97.8 | 100 |
| Rice sufficiency* | Sufficient | Insufficient | Sufficient | Sufficient |
| Water resource for agriculture* | Rain-fed | Rain-fed | Irrigated, Mekong River | Partly irrigated stream and underground water |
| Households catching-fish for sale* (%) | – | 34 | 8 | 3 |

Sources: * key informants

** [Thailand, National Rural Development Committee 2000: Basic Data at Village Level in 1996 and 1999]

*Livestock Raising*

The numbers of livestock raised by the villagers varied among the villages and at the time of study there was a much lower number of buffaloes than cattle in all villages. This reflects land use patterns in each village. There are fewer numbers of livestock in Villages Mukdahan and Kalasin as compared to the other two villages because paddy land is used for dry season crops and availability of water for year-round cropping. This in turn reduces traditional livestock grazing land. Existing livestock raisers therefore must resort to a cut-and-carry system (tethered animals are fed by cutting grass and bringing it to the animals). This practice increases the demand for labor. In Village Mukdahan some farmers started to form a livestock raising group. They thought that such a livestock group organization was necessary under the present circumstances of limited resources as they would have to share resources, management, and marketing. In Villages Khon Kaen and Kalasin a traditional grazing system for livestock raising is practiced. In Village Khon Kaen year-round grazing is possible due to available public land while in Village Kalasin the grazing system recently increased when more upland areas became available as result of upland crop production becoming economically less attractive for the farmers.

*Fishing*

Since Village Kalasin is close to a reservoir, most households are able to catch fish for home consumption and in 34% of the households fishing is the major source of income. Village Srisaket is close to a weir and only 3% of the households can catch fish for sale, whilst in Village Mukdahan, close to the Mekong River, only 8% can engage in fishing as an income-generating activity.

*Shifting Roles of Livestock*

The changing roles of livestock are analyzed and presented based on comparisons with the traditional roles it played that have declined in intensity, or, totally, or almost, disappeared as those roles were replaced by other inputs (Table 2).

*Role Related to Draught Power*

Animal power utilization has been related to land preparation for paddy and upland crops, weeding, and paddy threshing. These roles still exist but have greatly declined and have largely been replaced by farm mechanization, such as small tractors for paddy land and to some extent upland, large tractors for upland, herbicide application, and mobile threshing machines. Roles related to production and human transportation have been completely replaced by small tractor-drawn vehicles, bicycles, motorcycles, trucks, or even cars.

*Food and Environmental Roles*

Fish raising has been continuously promoted in the northeast, however, in some areas water quality in fishponds is poor. Recently, it has been increasingly discovered that manure is

**Table 2** Diminishing Roles of Livestock Sub-system in Small Holder Agricultural Production System in Northeast Thailand

| Roles | Magnitude and Direction of Changes | Replaced by | Reasons for Replacement |
|---|---|---|---|
| Land preparation | Greatly reduced | Mainly small hand tractors and some four-wheel tractors | Cropping practices, land use, labor migration, low livestock price |
| Weeding | Greatly reduced | Mainly herbicide use in paddy and sugar cane | Cropping practices, land use, labor migration, availability of livestock |
| Transportation | Very rarely practiced | Modified small tractors, motor-cycles, bicycles, cars or trucks | Availability and social value of livestock, access to roads |
| Soil fertility maintenance (manure) | Greatly reduced | Mainly chemical fertilizer | Livestock population and manure and raising management |
| Maintaining water quality in fish ponds (manure) | Not clear but appears to be a new role | Increasing water quality for fish culture, few cases | More demand for fish protein for food |
| Ecology, bio-diversity, natural food (manure) | Degraded but may have a prolonged and wide impact | Indirect and unintentional chemical pollution | Livestock population and manure and raising pattern |
| Utilization and distribution of crop residues or manure | Reduced and may have an impact on ecology | Rice threshing machine | Livestock population and threshing machine |
| As collateral for loans | Coming to have a new but yet informal role | Some monetary institutions informally consider this as collateral | Higher livestock price |
| Traditional local livestock trader | Reduced but more a change in management | More organized local market | Government intervention, access to roads, livestock price and demand |
| Inheritance | Greatly reduced | Money and consumer goods | Livestock social value, price, and availability and change in concept of inheritance |
| Social status | Greatly reduced | Income, housing and furniture, consumer goods, other social alternatives | Access to other social alternatives |
| Food for traditional festivals | Reduced, for special occasions only | Other types of livestock and consumer goods | Livestock price |
| Taboo (meat from albino buffalo) | Reduced | Modern knowledge | Education, media |
| Local meat market | Expanded | New slaughtering regulations | Market demand |
| Traditional handicrafts | Reduced | Consumer goods | Availability of materials from livestock, price and design of consumer goods, social value |

being put into fishponds to improve water quality or to increase water fertility for fish raising. But this practice is still limited.

The contribution of livestock to the ecology through manure in terms of soil fertility has declined due to reduction in livestock population density. In the past farmers had intentionally applied manure to fertilize their paddy fields, as well as home garden plots, but this practice was replaced by chemical fertilizer application. In the past application of manure in paddy fields was strongly related to beliefs and rituals, such as the *heag na* practice. In addition traditionally livestock were raised by a free grazing system in paddy fields or public lands and thus their manure was widely distributed on the soil as a fertilizer. Dung beetles that lived on manure not only helped spread the manure but some of the beetles also became a food source for farmers as well as home-raised chickens. The above environmental benefit is now very limited as manure diminishes with the decline of livestock populations.

In terms of natural food for human consumption, when livestock populations declined, natural food also did. Besides dung beetles as mentioned above, certain wild fruit seed regurgitated by livestock could be shelled and consumed as nuts by humans. Manure spread in natural water could fertilize and increase populations of aquatic life, such as various species of fish, crabs, aquatic insects, which could be turned into human food. With decreased manure and at the same time wide application of toxic agricultural chemicals, the farmers realized that their natural food declined as the result of a changing ecology and the local people became much more dependent on external food sources.

*Economic Role*

In the past livestock had been strategically used as a saving bank and commodity to be sold for immediately needed cash as there were no banks, monetary institutions, or farmer saving groups in rural areas. As livestock populations declined, dependency of farmers on the above sources of money became vital to their livelihoods. But recently as the price of livestock has greatly increased, many farmers want to go back to livestock raising again. However, they may meet with some difficulties because of changes in patterns of land use, investment costs, a changed ecology, and housing design. In the case of housing design, farmers used to keep their animals underneath their houses. Now many houses do not have any space to accommodate the animals. More densely laid out housing also prevents the keeping of livestock.

Recently livestock has been informally considered as a potential asset for loan repayment by some monetary institutions.

Livestock involvement in bartering systems, such as exchanges for land rights and other necessary goods, was mostly replaced by a buy-and-sale system especially in popular weekly livestock markets. Convenient routes and transportation also facilitated the sale of livestock. All of these factors caused more of a decline in livestock populations and the decline in turn stimulated more demand beyond the local level. Due to the high value of cat-

tle or buffalo meat, exchanging meat for farm labor has been recently observed. The role of livestock as an inheritance passed on from parents to sons or daughters, or as a show of socio-economic status, has been mostly replaced by cash or consumer goods.

It might be possible for an area with concentrated populations of buffaloes to be used as an attraction for agro-tourism as has been recently introduced in the northeast.

*Other Roles*

Cattle or buffalo meat has been a delicacy offered during special occasions such as weddings, ordination of monks, and important traditional activities. As its price rose, pork became a major alternative source of meat. At the same time decentralized slaughtering regulations to the local administrative level has allowed widespread local meat markets and consumption.

Buffalo leather, once commonly crafted into different characters in folk tales has been used in shadow plays and cow hides, made into traditional drums for local entertainment and religious purposes, have seen a decline. These roles yielded increasingly to more modern forms of entertainment. However, there are new types of machines that can craft buffalo horns into various quality crafts. Increasingly rare are other products from animal by-products such as sling-shot handles or a handsaw straightening device made of horn, or rope for elephant round ups or a yoke rope for ploughs made from buffalo leather.

Diminishing livestock populations and utilization also affect ritual activity. Rope made from buffalo hide that was used in the elephant round-up ritual is now preserved only for tourism. A taboo prohibiting mothers with a newly born baby from consuming albino buffalo meat has been made obsolete by modern knowledge.

The use of manure as cement to harden the floor of paddy threshing yards has been widely replaced by threshing machines or other methods of threshing. The role of livestock in crop residual utilization, such as grazing livestock on rice stubble left in the paddy field after harvesting, rice straw preserved for low season feed staff, rice straw application to the paddy field in the form of compost as before have all been greatly reduced.

Though rarely adopted, there has long been promotion in the region of bio-gas production from livestock manure.

## Discussion

*Impact of Shifted Roles of Livestock*

*Animal Power*

Reduced livestock populations, labor out-migration, and loans from monetary institutions for agricultural inputs have contributed to more farm mechanization and less animal power utilization. It is difficult to pinpoint which one has been more important than the others or their temporal sequence. But even small farm machinery is relatively expensive and its function

depends on mostly imported fossil fuel that is also expensive and not renewable. Broken farm machinery sometimes cannot be repaired. Even when repairable, service from outside the community is usually needed or it becomes too expensive to be repaired. Very often the broken machinery is left unrepaired. To use this machinery, especially small hand tractors, one must be physically strong. This limits the range of people who can use them. Due to strong vibrations while operating the machine, many users experience health problems. At the same time the unsafe design of the machine often causes accidents and even death. Moreover, farm machinery operation and the machinery itself are non-renewable resources whilst livestock can be bred and raised by the farmers with low inputs and without pollution. Subhadhira *et al.* [1987: 93–94] reported that using animal power consumed much less energy than farm machines.

However, under labor shortage circumstances, farm machinery can help the farmers finish their work faster and on time and there is no need for labor to look after livestock. Farmers related that many years of chemical fertilizer use resulted in hardened soil surfaces and therefore ploughing by tractor was easier than by buffalo.

*Environment*

The use of manure to improve water quality for fish culture is a rather new and indirect role livestock is coming to play. In many cases farmers indicate that using chemical fertilizer causes hardened soil surfaces, increasing cost of inputs, pollution, decreased bio-diversity and increased dependency on external resources. Decreased bio-diversity in turn reduces natural food for human as well as animals. This puts more pressure on farmers to buy food from outside their own community. From ecological and health points of view, the farmers relate that without livestock to graze on the paddy buns, overgrowth of grasses and weeds made the paddy buns a habitat for rats. As the rat populations grow, diseases like *leptospirosis* spread.

*Economics*

Livestock as a form of savings, loans, inheritance, dowry or bartering has been replaced by monetary institutions or local moneylenders. This replacement causes the farmers to sell their livestock to repay their debt and thus instigates an even greater reduction in the number of livestock. However, although at the time of this study many farmers wanted to reintroduce livestock into their livelihoods and as a way of saving, high investment costs remain a limitation.

A government-introduced rice variety that has become widely adopted is photoperiod-sensitive and has to be harvested in a short time. This has created a peak period for labor, especially for those who own a large area of paddy fields. To alleviate this problem some farmers have used livestock meat to exchange for needed labor. Cattle as well as buffalo were traditionally used as inheritance for younger generations but has now largely been replaced by other commodities as in the case of using livestock as a socio-economic status

indicator.

From a case mentioned earlier, in specific areas livestock raising in combination with agro-tourism may be an alternative income source for farmers and at the same time livestock raising could be maintained for other purposes.

*Social Aspects*

Replacement of the livestock by external inputs has produced subsequent undesired impacts on community systems such as economic and social dependency, loss of indigenous knowledge, and probably consumption behavior. The diminishing role of livestock in the way of life of the rural people was earlier reported by Nakajud [1962 cited by Rufener 1971: 21].

*Other Aspects*

Beside dependency on external inputs and technology, the decline of livestock populations has left crop residues, such as rice straw, unused and wasted and no longer changed into something of value such as meat and meat products. Livestock meat consumption has changed from consumption only during important occasions to a more general pattern due to regulatory changes. This has had an impact on livestock demand.

In conclusion, the roles of livestock in rural farming systems have tremendously declined in their intensity and some have completely disappeared. Mostly non-renewable external resources compensate for the above roles. Thus the farmers have became less and less self-reliant. At the same time the non-renewable resource uses put more pressure on the environment. Their production systems therefore have varied according to fluctuations of price and availability of the inputs acquired from outside in addition to natural influences. In the long run this may raise a question on their sustainability and weaken self-reliance and even communities as a whole [Simaraks 1998: 20].

It is clear that livestock had traditionally played important roles in the farming systems in the rural area of the northeast region of Thailand. But is it possible to again integrate livestock subsystem into the present farming systems? Since the socio-economic situation of the systems has dynamically and to great extend changed, it requires careful consideration to undertake this task.

*Limitation to Revival of Livestock as a Subsystem of Self-reliant Production Systems*

*Limitation*

Raising areas, at present public forests or land for livestock grazing, are commonly used for cropping even during the dry season. To increase livestock populations by a free grazing system as in the past will require more effort, especially labor, to closely look after the animals as they may damage crops. Moreover, the problem of theft is still quite prevalent. On the other hand, a common practice of pesticide or herbicide application to the crops is dangerous for livestock. In many cases the farmers have to fence their crops against the animals. However, cash crops may not be totally negative for livestock because part of the

crops can be used as animal feed. But this practice is very limited.

Due to the high price, investment in livestock requires loans at a time when most farmers are already in debt. In regard to problem of access to capital, even though there are many formal and informal capital resources, getting a loan for livestock raising needs collateral or group guarantees and involves bureaucratic procedures.

The problem of labor shortages for livestock raising arises from reduced family size which is itself due to successful family planing, out migration of labor, and more open education opportunities as people with better education simply do not want to return to their farms. Moreover, the existing curricula do not gear students up for a return to their communities.

Village settlement and house design also have important effects. In the past houses were built at a certain distance from each other, even though they were laid out in a cluster pattern. Now, due to population pressure, each house is rather close. In the past houses were built to accommodate livestock underneath at night. Now the underneath is modified and used for humans. Both factors limit the return of livestock as farmers have to be with their animals at night outside the village settlement to prevent livestock theft.

To raise livestock in a densely housed village, the animals and its manure will create an uneasy circumstance and disturb neighbors. In some communities livestock raisers are looked down upon as old-fashioned. This indicates a decline in the value or social perception of livestock raising and may limit livestock raising.

*Opportunity*

Most of the farmers recognized high market prices, wider spread local markets, and more available loan sources as opportunities for livestock raising.

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